Claims

1.   A device (10; 60) for measuring the distribution of
selected properties of a material (16) arranged on a conveyor
means (17), said device comprises

5   -   an emitter (12) of electromagnetic radiation arranged
at one side of said conveyor means (17), said emitter emits
electromagnetic radiation (18) in a multiple of frequencies in
a selected frequency range towards said material (16),

        -       at least a sensor (13) arranged on an opposite side
1   of said conveyor means (16), compared to said emitter (12),
said sensor (13) detects electromagnetic radiation (19) in
said selected frequency range being emitted from said material
(16), said electromagnetic radiation originating from said
emitter (12), and

1!   -   an analyser (14) is arranged to receive information
regarding said emitted electromagnetic radiation (18) and said
detected electromagnetic radiation (19), said information
comprises amplitude and/or phase for each selected frequency,

        characterised in that said device further comprises:

20   -   an image device(15; 61-63) which is arranged to send
information to said analyser (14),to create a three
dimensional contour of the material,

        said analyser (14) is arranged calculate the selected property
distribution in said material (16) based on the received
25   information.

2.   The device according to claim 1, wherein said image
device is a memory (15), having stored information regarding
the three dimensional contour of the material (16).

3.   The device according to claim 1, wherein said image device comprises at least an imaging sensor (61, 62) is connected to an image processing device (63), said at least one imaging sensor (61, 62) each detects an image of said material, which is processed into a three dimensional contour of said material in said image processing device (63).

4.   The device according to claim 3, wherein said at least one imaging sensor (61, 62) detects a picture of the reflectivity in optical wavelengths.

5.   The device according to claim 4, wherein said at least one sensor of a second type is a video camera (61, 62).

6.   The device according to any of claim 3, wherein said imaging sensor detects a picture of the reflectivity and transmissivity and propagation speed of sound waves.

7.   The device according to claim 6, wherein said at least one sensor of a second type is an ultrasound imaging device.

8.   The device according to any of claims 1-7, wherein said analyser (14) is provided with means to interpolate previously measured results, stored in a memory, to obtain the selected property distribution in said material (16).

9.   The device according to any of claims 1-7, wherein said analyser (14) is provided with means to calculate the dielectric distribution in said material (16) and convert said dielectric distribution into the selected property distribution in said material (16).

10.   The device according to claim 9, wherein said means to calculate the dielectric distribution comprises

-       a three dimensional model (20, 30) determining regions within said material (16) where the dielectric function is assumed non-changing, and

-       means to apply said model (20, 30) to said three dimensional contour of the material,

whereby a dielectric distribution is obtained.

11.   The device according to claims 9 or 10, wherein said device is provided with means to convert said dielectric distribution into the selected property distribution.

12.   A method for measuring selected properties of a material (16) arranged on a conveyor means (17), said method comprising the steps:

(a)   emitting electromagnetic radiation (18) in a selected frequency range towards said material (16) from an emitter (12) arranged at one side of said conveyor means (17),

(b)   detecting electromagnetic radiation (19) in said selected frequency range in a sensor (13) arranged on an opposite side of said conveyor means (16), compared to said emitter (12), said electromagnetic radiation (19) being emitted from said material (16), said electromagnetic radiation (19) originating from said emitter (12),

(c)   transmitting information, comprising amplitude and/or phase for each selected frequency, regarding said emitted electromagnetic radiation (18) and said detected electromagnetic radiation (19) to an analyser (14),

characterised in that said method further comprises the steps:

(d)   transmitting information, comprising information to create a three dimensional contour of the material, to said analyser (14), and

(e)   calculating the selected property distribution in said
5   material (16) by analysing said information in the analyser.

13.   The method according to claim 12, wherein the step of calculating the selected property distribution comprises the step of interpolating previously measured results, stored in a memory.

10   14.   The method according to claim 12, wherein said step of calculating the selected property distribution comprises the steps:

-       calculating of the dielectric distribution in said material using the information regarding emitted (18) and
15   detected (19) electromagnetic radiation, and

-       converting the dielectric distribution into the selected property distribution in said material (16).

15. The method according to claim 14, wherein said step of calculating the dielectric distribution comprises the steps:

20   -   providing a three dimensional model (20, 30) determining regions within said material (16) where the dielectric function is assumed non-changing, and

-       applying said model (20, 30) to a three dimensional contour obtained by an imaging device (15; 61-63).

25   16.   A system comprising a device according to any of claims 1 to 11, said instrument evaluates the measurement data based on a method according to any of claims 12 to 15 in order to obtain information on the spatial distribution of the said

dielectric and magnetic properties of said materials, which
information is used to calculate the temperature, density
and/or water contents distribution of said materials.